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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/507,095

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Gerhard Tuymer

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NOTARO AND MICHALOS
100 DUTCH HILL ROAD
SUITE 110
ORANGEBURG, NY 10962-2100

EXAMINER

BAND, MICHAEL A

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/507,095	Applicant(s) TUYMER ET AL.	
	Examiner MICHAEL BAND	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
2. Claims 2-4, 6, 16-17, and 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Regarding claims 2-4 and 19-20, the phrases "preferable", "preferably", and "preferred" render the claims indefinite because the claims include elements not actually disclosed, thereby rendering the scope of the claims unascertainable. See MPEP § 2173.05(d). Therefore the claims have been interpreted as written while excluding the claimed material pertaining to preferable, preferably, or preferred.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
5. Claims 1, 4, 6-7, 13-17, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kohler et al (US Patent No. 5,464,667).

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With respect to claim 1, Kohler et al discloses an apparatus for the plasma deposition of a coating onto a substrate (i.e. workpiece) by providing said substrate in a vacuum chamber and generating a plasma jet in said vacuum chamber (abstract). Kohler further describes utilizing a Airco Temescal Model CL-2A to supply DC power via two supplies [80], [85] (col. 5, lines 49-60), where an AC power is supplied to a full wave bridge rectifier to yield an output (col. 13, lines 64-67). It is inherent that a mains connection is present in the device. It is also inherent that since an AC voltage is switched to a pulsating DC voltage, a converter is present as well. In addition, the Airco Temescal model CL-2A has a control input (i.e. dials and switches) for setting and regulating the converter output voltage as evidenced by the picture of the Airco Temescal model CL-2A (PTO-892, Ref. U). Kohler et al also discusses yielding an output through a power transformer of a negative absolute sine wave starting at zero volts (i.e. potential free) and going to a peak negative value of about 5000 volts (col. 13, lines 64-6; col. 14, lines 1-3), with the transformer switched for the galvanic decoupling of the generator output. Kohler et al also discusses a maximum output of 500 mA and 120 Hz for the AC/pulsating DC power, with a another power supply having 20 times the maximum output, resulting in 10 A and 2400 Hz (2.4 kHz) (col. 5, lines 56-66) in addition to an output of 100 A and 24000 Hz (24 kHz) (col. 6, lines 31-36). An article on bridge circuitry by www.wikipedia.com (PTO-892, Ref. V) has also been provided for further evidence.

With respect to claim 4, Kohler et al further discloses the DC power pulsating at 25-1000 times/second (col. 5, lines 49-52) with the time period for an entire cycle being

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1/120 of a second, which is twice the frequency of the AC line input voltage to the power supply (col. 14, lines 25-27), thus the converter from AC to DC power is clocked.

With respect to claim 6, Kohler et al further discloses that the power is supplied via Airco Temescal CL-2A having a full wave bridge rectifier (i.e. circuit) (col. 13, lines 63-66). It is also well known that a bridge circuit (i.e. Wheatstone bridge circuit) has four resistors, with two resistors being fixed, one resistor being unknown, and one resistor being variable as evidenced by www.wikipedia.com (PTO-892, Ref. V), thus the resistors act as controllers for regulating the pulse behavior.

With respect to claim 7, Kohler et al further discloses the DC power, and thus the bridge circuit, providing a voltage that typically passes through zero (i.e. pulse interspace) about 25-1000 times/second (col. 5, lines 49-52).

With respect to claim 13, Kohler et al further discloses depositing a carbon layer onto a substrate by expanded gaseous reactive ionized and neutral hydrocarbon fragments (abstract; col. 3, lines 50-54), where a feed (i.e. reactive) gas of acetylene is used to mix with the carbon (col. 4, lines 10-20).

With respect to claim 14, Kohler et al further discloses using a hollow cathode (i.e. deposition) system containing a cathode made of two electrode plates (abstract), where the cathode is connected to the DC power supply system (col. 4, lines 65-67).

With respect to claims 15, 17, and 19, Kohler et al further discloses depositing a carbon layer (abstract), with carbon being well known to be a dielectric material and as a hard material (i.e. diamond). Furthermore, Kohler et al discusses the feed gas containing oxygen or an oxygen-containing hydrocarbon (col. 12, lines 4-15).

With respect to claim 16, Kohler et al further discloses the power system being used in sputter systems (col. 5, lines 1-5), thus the carbon layer being known to be sputtered.

6. Claims 2-3, 8-11, and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kohler et al (US Patent No. 5,464,667).

With respect to claim 2, Kohler et al further discloses an output voltage of the full wave bridge rectifier and transformer of 0.5 A and 200 volts (col. 13, lines 64-67; col. 14, lines 1-5). Kohler et al also discusses the time period for this entire cycle being 1/120 of a second, or twice the frequency of the AC line input voltage to the power supply (col. 14, lines 25-27). However Kohler et al is limited in that a specific input voltage and current for the Airco Temescal model CL-2A is not provided. It is either inherent or obvious to use a voltage and/or current with a voltage transformation ratio no greater 1:2, as evidenced by Melnychuk et al (US Patent No. 6,815,700; abstract; col. 22, lines 50-57).

With respect to claim 3, Kohler et al further discloses a 1 kilowatt leakage-type transformer including full wave rectification to achieve pulsating DC output. However Kohler et al is limited in that while it is well known that all electronics give off a residual magnetic (i.e. leakage inductance) field, a specific leakage inductance is not suggested. It is either inherent or obvious to have a transformer with a leakage inductance below 50 μ H, as evidenced by Vinciarelli (US Patent No. 6,107,860; abstract; col. 13, lines 55-67; col. 14, lines 1-15).

With respect to claim 8, Kohler et al further discloses a leakage type transformer attached to a full wave bridge rectifier (i.e. circuit). It is inherent that a leakage transformer has a primary and secondary side capable of being shorted, as evidenced by www.wikipedia.com (PTO-892, Ref. W). Therefore it is obvious to one of ordinary skill in the art that the transformer of Kohler et al is capable of having either the primary or secondary side short-circuited.

With respect to claims 9-11, Kohler further discloses the power supply having a power transformer supplying power to a full wave bridge rectifier (i.e. circuit) of 0.5 ampere (col. 13, lines 64-66), with the same power supply capable of having two transformers in parallel for 1 ampere (col. 5, 56-62; col. 6, lines 5-12), thus necessitating having two bridge rectifiers (i.e. circuits). Furthermore another power supply of 10 ampere (col. 5, lines 63-66) is discussed, thus necessitating having twenty bridge rectifiers (i.e. circuits).

With respect to claim 20, Kohler et al further discloses depositing a carbon layer (abstract), with carbon being well known to be a dielectric material and as a hard material (i.e. diamond). Due to the various crystalline structures formed by carbon (i.e. diamond, fullerenes, graphite, etc.) it is either inherent or obvious for carbon to have alpha- and gamma-phases.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al (US Patent No. 5,464,667) as applied to claim 1 above, and further in view of Mark (US Patent No. 5,303,139).

With respect to claim 5, the reference is cited as discussed for claim 1. However Kohler et al is limited in that it is not suggested to have the DC pulse be a bipolar pulse.

Mark teaches a pulsed bipolar power supply for a plasma chamber, where an adjustable DC power is supplied to a transistor bridge circuit (abstract). Mark also teaches processes utilizing this power supply as physical vapor deposition (PVD) and chemical vapor deposition (CVD). Mark cites the advantage of using this DC bipolar pulsed as being inexpensive and safe (col. 1, lines 36-38).

It would have been obvious to one of ordinary skill in the art to use a bipolar pulsed DC power supply taught in Mark for the pulsed DC power supply of Kohler et al to gain the advantages of an inexpensive and safe power supply.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al as applied to claim 9 above, and further in view of Raets et al (USPGPub 2002/0012254).

With respect to claim 12, the references are cited as discussed for claim 9. However Kohler et al is limited in that the bridge circuits are switched offset in phase is not specified.

Raets et al teaches a converter using a full-bridge circuit and transformer (abstract; p. 2, 0017). In addition, Raets et al discusses operating the full-bridge circuit switched to a time-offset (in phase) setting (p. 2, para 0025). Raets et al also states that this converter is suitable for use with different mains voltages of different AC voltage networks (abstract), with figs. 2 and 3 depicting pulsed voltages. Raets et al cites the advantage of this converter and bridge circuit as allowing for different ranges of a DC output voltage (p. 1, para 0008).

It would have been obvious to one of ordinary skill in the art to use the bridge circuit switching taught in Raets et al for the power supply of Kohler et al to gain the capability of setting different ranges of a DC output voltage.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kohler et al as applied to claim 17 above, and further in view of Okano et al (US Patent No. 5,591,486).

With respect to claim 18, the reference is cited as discussed for claim 17. However Kohler et al is limited in that it is not suggested to deposit aluminum oxide.

Okano et al teaches a method for forming a film on a substrate by a hollow cathode discharge (abstract; col. 9, lines 4-13). Okano et al further teaches depositing carbon and aluminum (col. 11, lines 5-10 and 56-63; col. 12, lines 1-5). Okano et al also discusses using oxygen as a reactive gas (col. 5, lines 48-51).

Since the prior art of Okano et al recognizes the equivalency of carbon and aluminum in the field of deposition by a hollow cathode, it would have been obvious to one of ordinary skill in the art to replace carbon (i.e. diamond-like carbon) of Kohler et al

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with the aluminum of Okano et al as it is merely the selection of functionally equivalent hard ceramics recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent No. 4,600,563; US Patent No. 4,780,803; US Patent No. 4,877,999; US Patent No. 4,891,118; US Patent No. 6,005,218; US Patent No. 6,815,700.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795